

PATENT ABSTRACTS OF JAPAN

(11)Publication number : **11-091315**

(43)Date of publication of application : **06.04.1999**

(51)Int.Cl.

B60C 11/04

B60C 11/13

B60C 11/11

(21)Application number : **09-262494**

(71)Applicant : **BRIDGESTONE CORP**

(22)Date of filing : **26.09.1997**

(72)Inventor : **KANAZAWA KENICHI**

(54) PNEUMATIC RADIAL TIRE FOR WHOLE SEASON PASSENGER CAR

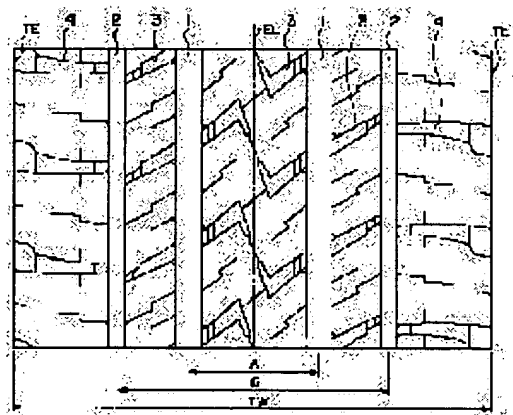
(57)Abstract:

PROBLEM TO BE SOLVED: To provide a good-noise-performance pneumatic radial tire for a whole season passenger car without reducing snow performance, dart performance, and hydro-planing resistant performance.

SOLUTION: This radial tire is equipped with a pair of right and left central circumferential grooves 1, side part circumferential grooves 2 placed between central circumferential grooves and tread ends, central crossing grooves 3 which extend from a tread central part in the direction crossing a tread and open to the side part circumferential grooves 2, and side crossing grooves 4 which open to the side part circumferential grooves 2 and extend in the direction crossing the tread. Interval between central circumferential grooves 1 is 20 or 35%

of a tread width, interval between side circumferential grooves 2 is 55 or 65% of the tread width, and the side crossing grooves 4 extend from an opening end to the side part circumferential grooves 2 to the tread ends with gradually increasing groove width, the

central crossing grooves 3 extend from the opening end to the side part circumferential grooves 2 to neighbor of the tread central part with gradually increasing groove width, and finally extend to the tread central part with gradually decreasing groove width.



LEGAL STATUS

[Date of request for examination] 17.06.2004

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

(19)日本国特許庁 (J P)

(12) 公 開 特 許 公 報 (A)

(11)特許出願公開番号

特開平11-91315

(43)公開日 平成11年(1999)4月6日

(51)Int.Cl.⁶

識別記号

F I

B 6 0 C 11/04

B 6 0 C 11/06

B

11/13

11/11

F

11/11

11/04

B

H

A

審査請求 未請求 請求項の数3 OL (全 4 頁)

(21)出願番号

特願平9-262494

(71)出願人 000005278

株式会社ブリヂストン

東京都中央区京橋1丁目10番1号

(22)出願日

平成9年(1997)9月26日

(72)発明者 金沢 謙一

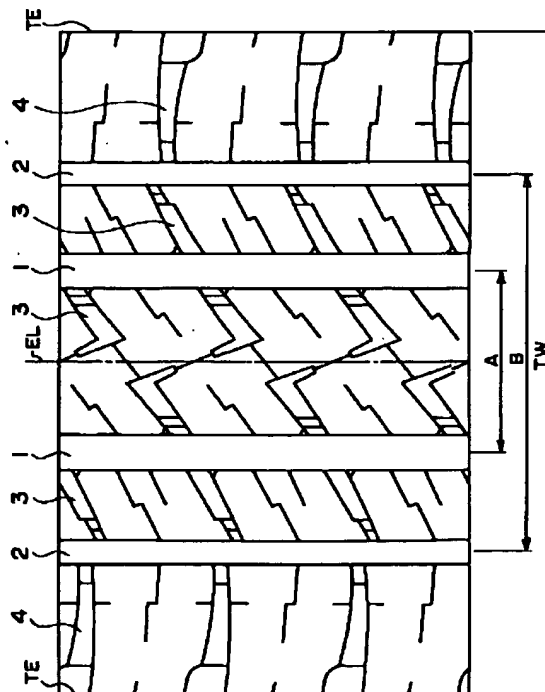
東京都小平市小川東町3-5-5

(54)【発明の名称】 オール・シーズン乗用車用空気入りラジアル・タイヤ

(57)【要約】 (修正有)

【課題】 雪上性能、グレート性能ならびに耐ハイドロブレーニング性能を低下することなく、騒音性能に優れたオール・シーズン乗用車用空気入りラジアル・タイヤを提供する。

【解決手段】 左右1対の中央周方向溝1と、中央周方向溝とトレッド端との間に配置された側部周方向溝2と、トレッド中央部からトレッドを横断する方向に延び側部周方向溝に開口する中央横断溝3と、側部周方向溝に開口しトレッドを横断する方向に延びる側部横断溝4とを備え、中央周方向溝の間隔はトレッド幅の20乃至35%で、側部周方向溝の間隔はトレッド幅の55乃至65%であり、側部横断溝は、側部周方向溝への開口端からトレッド端へ溝幅を漸増しながら延び、中央横断溝は、側部周方向溝への開口端からトレッド中央部近傍まで溝幅を漸増しながら延び、最後は溝幅を漸減しながらトレッド中央部へ延びているオール・シーズン乗用車用空気入りラジアル・タイヤ。



【特許請求の範囲】

【請求項1】 タイヤ赤道線を挟んでトレッドの両側に配置され、タイヤ周方向に延びる左右1対の中央周方向溝と、該中央周方向溝とトレッド端との間に配置され、タイヤ周方向に延びる左右1対の側部周方向溝と、トレッド中央部からトレッドを横断する方向に左右に延び、該中央周方向溝を横切り該側部周方向溝に開口するタイヤ周方向に間隔を置いて配置された多数の中央横断溝と、該側部周方向溝に開口しトレッドを横断する方向に延びトレッド端に開口する、タイヤ周方向に間隔を置いて配置された多数の側部横断溝とを備えた空気入りタイヤにおいて、(1) 該左右1対の中央周方向溝の間隔はトレッド幅の20乃至35%で、該左右1対の側部周方向溝の間隔はトレッド幅の55乃至65%であり、

(2) 該側部横断溝は、該側部周方向溝への開口端からトレッド端への開口端まで徐々に溝幅を漸増しながら延び、(3) 該中央横断溝は、該側部周方向溝への開口端から該中央周方向溝を横切りトレッド中央部近傍に至るまで溝幅を漸増しながら延び、最後は溝幅を漸減しながらトレッド中央部へ向けて延びていることを特徴とするオール・シーズン乗用車用空気入りラジアル・タイヤ。

【請求項2】 該中央横断溝は、該側部周方向溝への開口端近傍で溝深さが浅くなっていることを特徴とする請求項1記載の空気入りタイヤ。

【請求項3】 該中央周方向溝の溝幅は該側部周方向溝の溝幅の1.3乃至1.6倍であることを特徴とする請求項1乃至2記載の空気入りタイヤ。

【発明の詳細な説明】

【0001】

【産業上の利用分野】 本発明は空気入りタイヤに関するもので、特に、オール・シーズン乗用車用空気入りラジアル・タイヤに関するものである。

【0002】

【従来の技術】 従来の典型的なオール・シーズン乗用車用空気入りラジアル・タイヤは、図2に示すように、周方向にジグザグ状に延びる複数本の周方向溝と、周方向に対して傾斜した方向に延びる傾斜溝とによって、タイヤ軸方向および周方向に間隔を置いて多数のブロックが形成されたトレッド・パターンを備えていた。

【0003】 オール・シーズン乗用車用空気入りラジアル・タイヤには、雪上を走行したときの制動性能、発進性能、直進性能およびコーナリング性能などの雪上性能、ダート路面を走行したときのダート性能ならびに濡れた路面を走行したときの排水性能すなわち耐ハイドロプレーニング性能などの種々の性能が要求される。従来のオール・シーズン乗用車用空気入りラジアル・タイヤは、オフロード走行が主体であったので、上記のような雪上性能、ダート性能ならびに耐ハイドロプレーニング性能などの性能が優れていれば十分であった。しかしながら、最近では、オフロード走行主体からオンロード走行

主体の使用条件に変化して、その結果、タイヤへの要求性能も上記のような雪上性能、ダート性能ならびに耐ハイドロプレーニング性能などのほかにタイヤの騒音性能すなわちパターン・ノイズのレベルが低いタイヤが要求されるようになった。ところが、従来の設計技術ではタイヤの騒音性能は雪上性能、ダート性能ならびに耐ハイドロプレーニング性能とは相反する要求性能であって、前者のレベルを改良すると後者の性能が低下するというやっかいなものであった。

10 【0004】

【発明が解決しようとする課題】 本発明の目的は、従来のオール・シーズン乗用車用空気入りラジアル・タイヤの諸性能、特に、雪上性能、ダート性能ならびに耐ハイドロプレーニング性能などの性能を低下することなく、騒音性能に優れたオール・シーズン乗用車用空気入りラジアル・タイヤを提供することである。

【0005】

【課題を解決するための手段】 上記目的を達成するために、本発明の空気入りタイヤは、タイヤ赤道線を挟んでトレッドの両側に配置されタイヤ周方向に延びる左右1対の中央周方向溝と、該中央周方向溝とトレッド端との間に配置されタイヤ周方向に延びる左右1対の側部周方向溝と、トレッド中央部からトレッドを横断する方向に左右に延び該中央周方向溝を横切り該側部周方向溝に開口するタイヤ周方向に間隔を置いて配置された多数の中央横断溝と、該側部周方向溝に開口しトレッドを横断する方向に延びトレッド端に開口するタイヤ周方向に間隔を置いて配置された多数の側部横断溝とを備えた空気入りタイヤにおいて、(1) 該左右1対の中央周方向溝の間隔はトレッド幅の20乃至35%で、該左右1対の側部周方向溝の間隔はトレッド幅の55乃至65%であり、(2) 該側部横断溝は、該側部周方向溝への開口端からトレッド端への開口端まで徐々に溝幅を漸増しながら延び、(3) 該中央横断溝は、該側部周方向溝への開口端から該中央周方向溝を横切りトレッド中央部近傍に至るまで溝幅を漸増しながら延び、最後は溝幅を漸減しながらトレッド中央部へ向けて延びていることを特徴とするオール・シーズン乗用車用空気入りラジアル・タイヤである。

40 【0006】 上記目的を達成するために、本発明の空気入りタイヤでは、該中央横断溝は、該側部周方向溝への開口端近傍で溝深さが浅くなっていることが好ましい。

【0007】 上記目的を達成するために、本発明の空気入りタイヤでは、該中央周方向溝の溝幅は該側部周方向溝の溝幅の1.3乃至1.6倍であることが好ましい。

【0008】 発明者の研究結果によると、トレッドの接地形状と横断溝との間の角度差がパターン・ノイズに及ぼす影響は大きなもので、横断溝の形状と接地形状とが一致しないしは重なるとパターン・ノイズのレベルが悪化することが分かった。本発明の空気入りタイヤは上記の

ような構成であり、特に、中央横断溝が、側部周方向溝への開口端から中央周方向溝を横切りトレッド中央部近傍に至るまで溝幅を漸増しながら延びているので、トレッドの接地形状と中央横断溝との間に角度差が与えられ、パターン・ノイズの低いタイヤが得られる。

【0009】本発明の空気入りタイヤは上記のような構成であり、特に、中央横断溝が側部周方向溝への開口端近傍では溝幅が狭くしかも溝深さが浅くなっている

ので、ヒールアンドトーモ耗の発生が防止ないしは抑制され、その結果ある程度の距離を走行してトレッドゴムが摩耗した後のタイヤのパターン・ノイズのレベルを低く押さえることができる。

【0010】しかしながら、中央横断溝が側部周方向溝への開口端近傍では溝幅が狭くしかも溝深さが浅くなっていると、濡れた路面を走行したときの排水性能すなわち耐ハイドロプレーニング性能が低下することが懸念される。本発明の空気入りタイヤは上記のような構成であ

って、特に、中央周方向溝の溝幅が従来のタイヤと比

較して幅広になっていて、側部周方向溝の溝幅の1.3乃至1.6倍であるので、耐ハイドロプレーニング性能が低下する恐れはない。

【0011】

【発明の実施の形態】以下、本発明に従う実施例のオール・シーズン乗用車用空気入りラジアル・タイヤおよび従来のオール・シーズン乗用車用空気入りラジアル・タイヤについて図面を参照して説明する。タイヤ・サイズは、いずれも、225/75R15である。図1は本発明に従う実施例の乗用車用タイヤのトレッド・パターンの一部拡大正面図であって、図2は従来の乗用車用タイヤのトレッド・パターンの一部拡大正面図である。

【0012】図1に示す本発明に基づく実施例のタイヤは、タイヤの赤道線ELを挟んでトレッドの両側に配置されタイヤ周方向に延びる左右1対の中央周方向溝1と、中央周方向溝1とトレッド端TEとの間に配置されタイヤ周方向に延びる左右1対の側部周方向溝2と、トレッド中央部からトレッドを横断する方向に左右に延び中央周方向溝1を横切り側部周方向溝2に開口するタイヤ周方向に間隔を置いて配置された多数の中央横断溝3と、側部周方向溝2に開口しトレッドを横断する方向に延びトレッド端TEに開口するタイヤ周方向に間隔を置いて配置された多数の側部横断溝4とを備えている。左右1対の中央周方向溝1の間隔Aは47.6mmであり、左右1対の側部周方向溝2の間隔Bは99.2mmであり、トレッド幅TWは169mmであるから、中央周方向溝1の間隔Aはトレッド幅TWの28%で、側部周方向溝2の間隔Bはトレッド幅TWの59%である。側部横断溝4は、側部周方向溝2への開口端では溝幅が3.7mmであるが、側部周方向溝2への開口端からトレッド端への開口端まで徐々に溝幅を漸増しながら延び、トレッド端への開口端溝幅が11mmになってい

る。中央横断溝3は、側部周方向溝2への開口端では溝幅が3.1mmであるが、側部周方向溝2への開口端から中央周方向溝1を横切りトレッド中央部近傍に至るまで溝幅を漸増しながら延び、最後は溝幅を漸減しながらトレッド中央部へ向けて延びている。中央横断溝3は、トレッド中央部近傍の最も幅広の位置では溝幅が5.9mmである。中央横断溝3は溝深さが7.8mmであるが、側部周方向溝2への開口端近傍で溝深さが浅くなっている3.8mmになっている。中央周方向溝1の溝幅は9.8mmで側部周方向溝2の溝幅は6.5mmであり、中央周方向溝1の溝幅は側部周方向溝2の溝幅の1.5倍である。

【0013】図2に示す従来例のタイヤは、周方向にジグザグ状に延びる複数本の周方向溝と、周方向に対して傾斜した方向に延びる傾斜溝とによって、タイヤ軸方向および周方向に間隔を置いて多数のブロックが形成されたトレッド・パターンを備えている。

【0014】本発明に基づく上記実施例のタイヤと上記従来例のタイヤについて、タイヤの騒音レベル、雪上性能、グレート性能ならびに耐ハイドロプレーニング性能の評価試験を実施した。

【0015】タイヤの騒音レベルはサーキット・コースを走行したときのテスト・ドライバーによるフィーリングで評価したもので、雪上性能は圧雪路面のテスト・コースにおける制動性能、発進性能、直進性能およびコーナリング性能の総合フィーリング評価であり、グレート性能はグレート路面のテスト・コースにおける制動性能、発進性能、直進性能およびコーナリング性能の総合フィーリング評価であり、耐ハイドロプレーニング性能は水深5mmの濡れた路面を走行したときのハイドロプレーニング発生限界速度をフィーリングで評価したものである。

【0016】上記の評価試験の結果、10点満点で評価すると、タイヤの騒音レベルは上記従来例のタイヤが5.5であったのに対し本発明に基づく上記実施例のタイヤは6.5で、雪上性能は上記従来例のタイヤが5.0であったのに対し本発明に基づく上記実施例のタイヤは6.0で、グレート性能は上記従来例のタイヤも本発明に基づく上記実施例のタイヤも5.0であった。一方、ハイドロプレーニング発生限界速度の評価試験の結果は、上記従来例のタイヤが78km/hであったのに対し本発明に基づく上記実施例のタイヤは89km/hであった。

【0017】

【発明の効果】上記の結果から、本発明によって、雪上性能、グレート性能ならびに耐ハイドロプレーニング性能を低下することなく、タイヤの騒音性能に優れたオール・シーズン乗用車用空気入りラジアル・タイヤが得られることがわかる。

【図面の簡単な説明】

【図1】本発明によるタイヤのトレッド・パターンの一

5

6

部拡大正面図である。

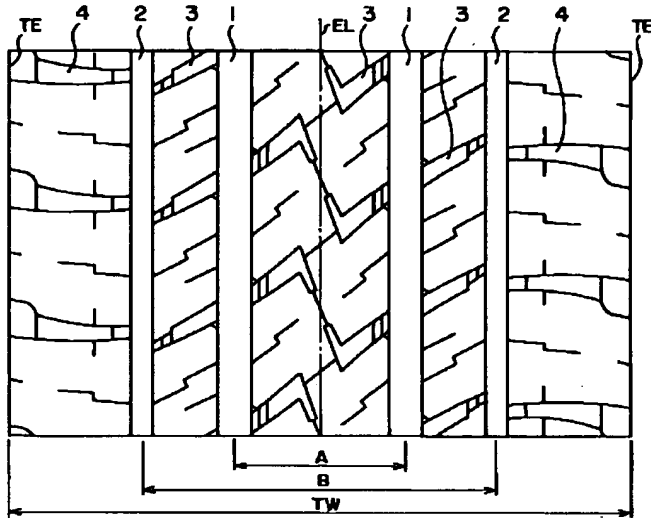
【図2】従来例のタイヤのトレッド・パターンの一部拡大正面図である。

【符号の説明】

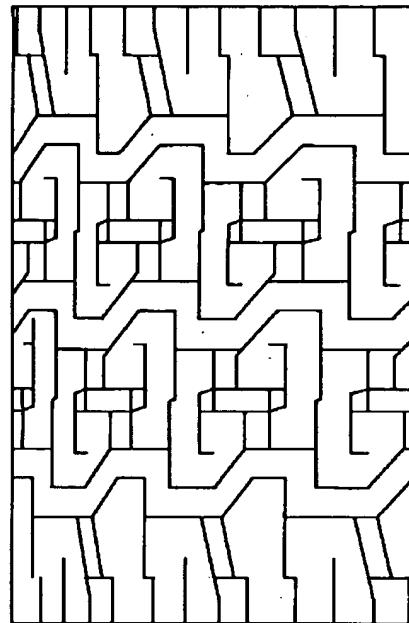
- 1 中央周方向溝
- 2 側部周方向溝
- 3 中央横断溝

- 4 側部横断溝
- A 中央周方向溝の間隔
- B 側部周方向溝の間隔
- EL タイヤの赤道線
- TE トレッド端
- TW トレッド幅

【図1】



【図2】



* NOTICES *

JPO and INPIT are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the radial-ply tire containing air for year-round passenger cars especially about a pneumatic tire.

[0002]

[Description of the Prior Art] The conventional typical radial-ply tire containing air for year-round passenger cars was equipped with the tread pattern with which spacing was kept and much blocks were formed in tire shaft orientations and a hoop direction of two or more hoop direction slots which extend in the shape of zigzag in a hoop direction, and the inclination slot which extends in the direction which inclined to the hoop direction as shown in drawing 2.

[0003] Various engine performance, such as wastewater engine performance when running the dirt engine performance and the wet road surface when running engine performance on the snow, such as braking engine performance when running a place on the snow, start engine performance, rectilinear-propagation engine performance, and cornering engine performance, and a dirt road surface, i.e., the hydroplaning-proof engine performance etc., is required of the radial-ply tire containing air for year-round passenger cars. Since off-road transit was a subject, the conventional radial-ply tire containing air for year-round passenger cars was enough when engine performance, such as the above engine performance on the snow, dirt engine performance, and hydroplaning-proof engine performance, was excellent. However, it changes to an off-road transit subject to an on-load transit subject's service condition, consequently the low, the noise engine performance of a tire, i.e., the level of a pattern noise, tire else [, such as the above engine performance on the snow, dirt engine performance, and hydroplaning-proof engine performance,] came to be required also for the military requirement to a tire recently. However, at the conventional engineering, the engine performance on the snow, the dirt engine performance, and the hydroplaning-proof engine performance were conflicting-requirement engine performance, and when the former level was improved, the latter engine performance fell [the noise engine performance of a tire / troublesome].

[0004]

[Problem(s) to be Solved by the Invention] The purposes of this invention are many engine performance of the conventional radial-ply tire containing air for year-round passenger cars, and offering the radial-ply tire containing air for year-round passenger cars which was excellent in the noise engine performance, without falling engine performance, such as engine performance on the snow, dirt engine performance, and hydroplaning-proof engine performance, especially.

[0005]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, the pneumatic tire of this invention The central hoop direction slot of one pair of right and left which are arranged on both sides of the tire equator line at the both sides of a tread, and are prolonged in a tire hoop direction, The flank hoop direction slot of one pair of right and left which are arranged between this central hoop direction slot and a tread edge, and are prolonged in a tire hoop direction, The central crossing slot of a

large number which kept spacing in the tire hoop direction which extends right and left in the direction which crosses a tread from a tread center section, crosses this central hoop direction slot, and carries out opening to this flank hoop direction slot, and have been arranged, In the pneumatic tire equipped with the flank crossing slot of a large number which kept spacing in the tire hoop direction which extends in the direction which carries out opening to this flank hoop direction slot, and crosses a tread, and carries out opening to a tread edge, and have been arranged (1) Spacing of the central hoop direction slot of one pair of these right and left is 20 of tread width of face thru/or 35%, and spacing of the flank hoop direction slot of one pair of these right and left is 55 of tread width of face thru/or 65%. (2) this flank crossing slot It extends increasing a flute width gradually gradually to the opening edge from an opening edge to the tread edge to this flank hoop direction slot. (3) this central crossing slot It is the radial-ply tire containing air for year-round passenger cars characterized by having extended increasing a flute width gradually until it crossed this central hoop direction slot from the opening edge to this flank hoop direction slot and resulted near the tread center section, and having prolonged the last towards a tread center section, dwindling a flute width.

[0006] In order to attain the above-mentioned purpose, as for this central crossing slot, it is desirable that the channel depth is shallow near the opening edge to this flank hoop direction slot in the pneumatic tire of this invention.

[0007] In order to attain the above-mentioned purpose, as for the flute width of this central hoop direction slot, in the pneumatic tire of this invention, it is desirable that they are 1.3 of the flute width of this flank hoop direction slot thru/or 1.6 times.

[0008] According to an artificer's research result, the effect the angular difference between the touch-down configuration of a tread and a crossing slot affects a pattern noise was big, and the configuration and touch-down configuration of a crossing slot were found by coincidence or that the level of a pattern noise gets worse when it lapped. The pneumatic tires of this invention are the above configurations, since the central crossing slot has extended especially, increasing a flute width gradually until it crosses a central hoop direction slot from the opening edge to a flank hoop direction slot and results near the tread center section, angular difference is given between the touch-down configuration of a tread, and a central crossing slot, and the low tire of a pattern noise is obtained.

[0009] The pneumatic tires of this invention are the above configurations, since the channel depth has moreover become [the central crossing slot / the flute width] narrow shallowly near the opening edge to a flank hoop direction slot especially, generating of heel-and-toe wear is prevented or controlled, and the level of the pattern noise of the tire after running a certain amount of distance as a result and wearing tread rubber out can be pressed down low.

[0010] However, we are anxious about falling, the wastewater engine performance, i.e., the hydroplaning-proof engine performance, when running the road surface on which a flute width is narrow near the opening edge to a flank hoop direction slot, and the channel depth moreover got wet when the central crossing slot was shallow. There is no possibility that the pneumatic tires of this invention are the above configurations, the flute width of a central hoop direction slot is broad especially compared with the conventional tire, and the hydroplaning-proof engine performance may fall since it is 1.3 of the flute width of a flank hoop direction slot thru/or 1.6 times.

[0011]

[Embodiment of the Invention] Hereafter, the radial-ply tire containing air of the example according to this invention for year-round passenger cars and the radial-ply tire containing air of the conventional example for year-round passenger cars are explained with reference to a drawing. Each tire size is 225 / 75R15. some tread patterns of the tire for passenger cars of an example with which drawing 1 follows this invention -- an expansion front view -- it is -- drawing 2 -- some tread patterns of the tire for passenger cars of the conventional example -- it is an expansion front view.

[0012] The tire of the example based on this invention shown in drawing 1 The central hoop direction slot 1 of one pair of right and left which are arranged on both sides of the equator line EL of a tire at the both sides of a tread, and are prolonged in a tire hoop direction, The flank hoop direction slot 2 of one pair of right and left which are arranged between the central hoop direction slot 1 and the tread edge TE,

and are prolonged in a tire hoop direction, The central crossing slot 3 of a large number which kept spacing in the tire hoop direction which extends right and left in the direction which crosses a tread from a tread center section, crosses the central hoop direction slot 1, and carries out opening to the flank hoop direction slot 2, and have been arranged, It has the flank crossing slot 4 of a large number which kept spacing in the tire hoop direction which extends in the direction which carries out opening to the flank hoop direction slot 2, and crosses a tread, and carries out opening to the tread edge TE, and have been arranged. The spacing A of the central hoop direction slot 1 of one pair of right and left is 47.6mm, the spacing B of the flank hoop direction slot 2 of one pair of right and left is 99.2mm, since the tread width of face TW is 169mm, the spacing A of the central hoop direction slot 1 is 28% of the tread width of face TW, and the spacing B of the flank hoop direction slot 2 is 59% of the tread width of face TW. It extends, while the flank crossing slot 4 increases a flute width gradually gradually to the opening edge from an opening edge to the tread edge to the flank hoop direction slot 2, although a flute width is 3.7mm at the opening edge to the flank hoop direction slot 2, and the opening edge flute width to a tread edge has become 1mm. It extended increasing a flute width gradually until the central crossing slot 3 crossed the central hoop direction slot 1 from the opening edge to the flank hoop direction slot 2 and resulted near the tread center section, although the flute width was 3.1mm at the opening edge to the flank hoop direction slot 2, and the last is prolonged towards the tread center section, dwindling a flute width. In the broadest location near the tread center section, the flute width of the central crossing slot 3 is 5.9mm. Near the opening edge to the flank hoop direction slot 2, the channel depth is shallow and the central crossing slot 3 has become 3.8mm, although a channel depth is 7.8mm. The flute width of the flank hoop direction slot 2 of the flute width of the central hoop direction slot 1 is 6.5mm in 9.8mm, and the flute width of the central hoop direction slot 1 is 1.5 times the flute width of the flank hoop direction slot 2.

[0013] The tire of the conventional example shown in drawing 2 is equipped with the tread pattern with which spacing was kept and much blocks were formed in tire shaft orientations and a hoop direction of two or more hoop direction slots which extend in the shape of zigzag in a hoop direction, and the inclination slot which extends in the direction which inclined to the hoop direction.

[0014] About the tire of the above-mentioned example based on this invention, and the tire of the above-mentioned conventional example, the evaluation trial of the noise level of a tire, the engine performance on the snow, the dirt engine performance, and the hydroplaning-proof engine performance was carried out.

[0015] The noise level of a tire is what was evaluated with the feeling by the test driver when running a circuit course. The braking engine performance [in / in the engine performance on the snow / the test course of a hardened snow road surface], the start engine performance, The rectilinear-propagation engine performance and the braking engine performance [in / by comprehensive feeling evaluation of the cornering engine performance / in ** and the dirt engine performance / the test course of a dirt road surface], It is comprehensive feeling evaluation of the start engine performance, the rectilinear-propagation engine performance, and the cornering engine performance, and the hydroplaning-proof engine performance evaluates the hydroplaning generating critical speed when running the wet road surface with a depth of 5mm with a feeling.

[0016] When ten-point full marks estimated as a result of the above-mentioned evaluation trial, the tire of the above-mentioned example based on this invention to the tire of the above-mentioned conventional example of the noise level of a tire having been 5.5 was 6.5, the tire of the above-mentioned example based on this invention to the tire of the above-mentioned conventional example of the engine performance on the snow having been 5.0 was 6.0, and the tire of the above-mentioned example based on [engine performance / dirt] this invention also in the tire of the above-mentioned conventional example was also 5.0. On the other hand, the tires of the above-mentioned example based on this invention to the tires of the above-mentioned conventional example of the result of an evaluation trial of hydroplaning generating critical speed having been 78 km/h were 89 km/h.

[0017]

[Effect of the Invention] The above-mentioned result shows that the radial-ply tire containing air

excellent in the noise engine performance of a tire for year-round passenger cars is obtained by this invention, without falling the engine performance on the snow, the dirt engine performance, and the hydroplaning-proof engine performance.

[Translation done.]

* NOTICES *

JPO and INPIT are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] The central hoop direction slot of one pair of right and left which are arranged on both sides of the tire equator line at the both sides of a tread, and are prolonged in a tire hoop direction, The flank hoop direction slot of one pair of right and left which are arranged between this central hoop direction slot and a tread edge, and are prolonged in a tire hoop direction, The central crossing slot of a large number which kept spacing in the tire hoop direction which extends right and left in the direction which crosses a tread from a tread center section, crosses this central hoop direction slot, and carries out opening to this flank hoop direction slot, and have been arranged, In the pneumatic tire equipped with the flank crossing slot of a large number which kept spacing in the tire hoop direction and have been arranged which extends in the direction which carries out opening to this flank hoop direction slot, and crosses a tread, and carries out opening to a tread edge (1) Spacing of the central hoop direction slot of one pair of these right and left is 20 of tread width of face thru/or 35%, and spacing of the flank hoop direction slot of one pair of these right and left is 55 of tread width of face thru/or 65%. (2) this flank crossing slot It extends increasing a flute width gradually gradually to the opening edge from an opening edge to the tread edge to this flank hoop direction slot. (3) this central crossing slot It is the radial-ply tire containing air for year-round passenger cars characterized by having extended increasing a flute width gradually until it crossed this central hoop direction slot from the opening edge to this flank hoop direction slot and resulted near the tread center section, and having prolonged the last towards a tread center section, dwindling a flute width.

[Claim 2] This central crossing slot is a pneumatic tire according to claim 1 characterized by the channel depth being shallow near the opening edge to this flank hoop direction slot.

[Claim 3] The flute width of this central hoop direction slot is a pneumatic tire according to claim 1 to 2 characterized by being 1.3 of the flute width of this flank hoop direction slot thru/or 1.6 times.

[Translation done.]